SESSION 9: FILTERS

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If there is a common theme to the papers in our session, it is the interdisciplinary and synergistic use of heretofore separate design techniques to achieve smaller, higher performance and intrinsically lower cost filter structures. The authors have combined computer modeling, dielectric resonators, evanescent mode waveguide and printed technology to achieve new levels of performance. Our session spans the frequency range 4 GHz to 100 GHz and treats bandpass, bandstop and multiplexed devices - the authors have evidently "cross-pollinated" a number of heretofore separate design concepts to achieve their results. This bodes well for the future of the microwave filter art. We seem to be entering into an era in which the newer technologies are becoming practical, moving from laboratory curiosities to actual system usage.

The first paper in the session uses printed circuit technology to achieve broadband multiplexers near 100 GHz. The authors show that structures built with their technique are intrinsically simple, small, high performance and low cost.

In the second paper, we will see the maturation process in action. Although computer optimized design has been with us for some time, the authors apply a better starting point and an efficient optimization routine to achieve broadband filters in W and D bands.

In the third paper, we find evanescent mode waveguide used as coupling element between dielectric resonators in a bandpass structure. Here, we are getting the best of both worlds. The authors are applying the high Q and stable dielectric resonators and the high Q inductive interconnection capability of the evanescent mode waveguide.

In the fourth paper, we again find dielectric resonators applied in below cut-off waveguide. The authors discuss both bandpass and bandstop configurations and combinations.

An interesting structure is discussed in paper #5. Here, the authors formalize the design theory for non-radiative dielectric waveguide filters. A variational method is used to design a test filter comprising longitudinally coupled dielectric resonators, at 49.5 GHz.

In the last paper of our session, the authors have taken advantage of dielectric materials developed for ablative use in the space shuttle. This is a prime example of "taking what they give you" as they say in a football broadcast. Here, the authors have chosen to use a material which would not be available were it not for an entirely unrelated development. As well as this innovative and ingenious application, the authors achieve some excellent and stable band reject filters.

In conclusion, our session covers a variety of applications and disciplines, demonstrating some true advances in the state of our art.